

WHAT IS CLAIMED IS:

1. A hydrodynamic bearing comprising:

a hollow member having a hollow portion provided with an opening portion at least one end thereof;

a rotating member including a rotating portion disposed inside said hollow portion so as to be rotatable relative to said hollow member and a shaft portion extending through said opening portion and arranged concentrically with an axis of rotation of said rotating portion;

fluid interposed between said hollow member and said rotating member;

hydrodynamic pressure-producing means acting on said fluid between opposite surfaces of said hollow member and said rotating member to produce hydrodynamic pressure between said opposite surfaces; and

a seal portion formed on an inner surface side of said opening portion and acting to prevent leakage of the fluid;

wherein at least one of said rotating member and said hollow member is made of a stainless steel containing from 12 to 16% chromium and from 6 to 10% manganese; and

wherein at least one of the opposite surfaces of said rotating member and said hollow member has undergone plastic deformation processing.

2. The hydrodynamic bearing of claim 1, wherein constitutional components of said stainless steel satisfy at

least one of the following requirements: (a) containing 2% carbon, (b) containing 2% nickel, (c) containing 0.15% sulfur, (d) containing 0.35% silicon, and (e) containing less than 0.05% phosphorus.

3. The hydrodynamic bearing of claim 1, wherein hydrodynamic pressure-producing grooves are formed in at least one of a surface of said rotating member and an inner surface of said hollow portion, and wherein said hydrodynamic pressure-producing means produces hydrodynamic pressure because the hydrodynamic pressure-producing grooves pump the fluid when said rotating member is rotating.

4. The hydrodynamic bearing of claim 2, wherein hydrodynamic pressure-producing grooves are formed in at least one of a surface of said rotating member and an inner surface of said hollow portion, and wherein said hydrodynamic pressure-producing means produces hydrodynamic pressure because the hydrodynamic pressure-producing grooves pump the fluid when said rotating member is rotating.

5. The hydrodynamic bearing of claim 1, wherein said rotating portion is a disklike member shaped like a disk and that said shaft portion is connected with a radial center of the disklike member perpendicularly to a disk surface of the disk member.

6. The hydrodynamic bearing of claim 2, wherein said rotating portion is a disklike member shaped like a disk and

that said shaft portion is connected with a radial center of the disklike member perpendicularly to a disk surface of the disk member.

7. The hydrodynamic bearing of claim 3, wherein said rotating portion is a disklike member shaped like a disk and that said shaft portion is connected with a radial center of the disklike member perpendicularly to a disk surface of the disk member.

8. A motor device comprising:

a hydrodynamic bearing of claim 1;

a rotor connected with the shaft of said hydrodynamic bearing;

a stator connected with said hollow member and supporting said hydrodynamic bearing and said rotor; and
driving means for rotating said rotor.

9. A motor device comprising:

a hydrodynamic bearing of claim 2;

a rotor connected with the shaft of said hydrodynamic bearing;

a stator connected with said hollow member and supporting said hydrodynamic bearing and said rotor; and
driving means for rotating said rotor.

10. A motor device comprising:

a hydrodynamic bearing of claim 3;

a rotor connected with the shaft of said hydrodynamic

bearing;

a stator connected with said hollow member and supporting said hydrodynamic bearing and said rotor; and driving means for rotating said rotor.

11. A motor device comprising:

a hydrodynamic bearing of claim 4;

a rotor connected with the shaft of said hydrodynamic bearing;

a stator connected with said hollow member and supporting said hydrodynamic bearing and said rotor; and driving means for rotating said rotor.

12. A method of plastic deformation processing of a hydrodynamic bearing having

a hollow member having a hollow portion provided with an opening portion at least one end thereof,

a rotating member including a rotating portion disposed inside said hollow portion so as to be rotatable relative to said hollow member and a shaft portion extending through said opening portion and arranged concentrically with an axis of rotation of said rotating portion,

fluid interposed between said hollow member and said rotating member,

hydrodynamic pressure-producing means acting on said fluid between opposite surfaces of said hollow member and said rotating member to produce hydrodynamic pressure between said

opposite surfaces, and

a seal portion formed on an inner surface side of said opening portion and acting to prevent leakage of the fluid,

at least one of said rotating member and said hollow member being made of a stainless steel containing from 12 to 16% chromium and from 6 to 10% manganese, said method of plastic deformation processing comprising the step of:

pressing at least one of the opposite surfaces of said rotating member and said hollow member to thereby harden the pressed surface.